Figure 11 depicts another embodiment of the present invention, where the optical filter comprises a rare earth metal thin film deposited on an optical output surface of the light source. In Figure 11, the hydrogen gas detector 50 comprises a light source 32 having an optical output surface 53. A rare earth metal thin film 56, which functions as the optical filter, is deposited on the output surface 53 of the light source 32. Said rare earth metal thin film 56 may comprise a rare earth metal selected from the group consisting of trivalent rare earth metals that are reactive with hydrogen to form both metal dihydride and metal trihydride reaction products, and such metal dihydride and metal trihydride reaction products have differing optical transmissivity. The rare earth metal thin film 56 is heated to an elevated temperature by a thermal energy source 54 that is separate from the light source 52. The rare earth metal thin film 56 is also overlaid by a protective layer 57, which may comprise a hydrogen-permeable material that is doped with a dopant such as Mg, Ca, Al, Ir, Ni, and Co, or a metal selected from the group consisting of palladium, platinum, and iridium.

In the Claims:

Amend claims 30 and 32, to read as follows[1]:

30. (Amended) A hydrogen gas detector, comprising:

a light source;

a thermal energy source that is separate from the light source;

an optical filter having an optical transmissivity responsive to the presence and concentration of hydrogen gas in an ambient environment to which the optical filter is exposed, said optical filter being disposed in proximity to the light source such that said optical filter is illuminated with light from the light source, and being operatively coupled to the thermal source such that the optical filter is heated by the thermal source to an elevated temperature;

[1] A marked up version of the amended specification and claims is set out in **Appendix A** hereof, consistent with the requirements of 37 C.F.R. §1.121(c)(i)(ii). A clean copy of all the pending claims 30-32, 35-45, and 63-70 is set out in **Appendix B** hereof.

a light detector generating an output signal, the state of said output signal being proportional to the intensity of light impinging on the light detector, said light detector being disposed in light-sensing relationship to the optical filter, whereby light from the light source passing through the optical filter impinges on the light detector and generates said output signal as a indication of the presence and/or concentration of hydrogen gas in the ambient environment.

32. (Amended) The hydrogen gas detector of claim 30, wherein the thermal energy source comprises a heat-generating element that is separate from the light source selected from the group consisting of resistive wires, exothermic chemical reactions, ultrasonic radiation, acoustic radiation, microwave radiation, and laser radiation.

Add new claims 63-70, as follows:

63. (New) A hydrogen gas detector for detection of hydrogen gas in a gaseous environment, said detector comprising:

a light/heat source that emits both luminescent and thermal energy,

an optical detector, and

an optical barrier therebetween,

wherein the optical barrier is disposed in proximity to the light/heat source so that the optical barrier is simultaneously illuminated and heated by said light/heat source, wherein said light/heat source emits sufficient thermal energy to heat said optical barrier to an elevated temperature, wherein the optical barrier responds to the presence of hydrogen by responsively changing from a first optical state to a different second optical state, and whereby transmission of light from said light/heat source through said optical barrier is altered by the presence of hydrogen and said altered transmission is sensed by said

optical detector to provide an indication of the presence of hydrogen gas in the gaseous environment.

64. (New) The hydrogen gas detector of claim 63, wherein the light/heat source comprises a lamp element emits heat incident to the generation of light.

65. (New) The hydrogen gas detector of claim 63, wherein the light/heat source comprises an incandescent lamp.

66. (New) The hydrogen gas detector of claim 63, wherein the light/heat source comprises a fluorescent lamp.

67. (New) The hydrogen gas detector of claim 63, wherein the optical barrier comprises a rare earth metal thin film.

68. (New) The hydrogen gas detector of claim 67, wherein the rare earth metal thin film is deposited on a roughened substrate and has a roughened surface morphology.

69. (New) The hydrogen gas detector of claim 68, wherein the substrate is roughened by a method selected from the group consisting of mechanical roughening, chemical roughening, deposition of highly exfoliated or porous inorganic underlayers, and deposition of porous polymer underlayers.

70. (New) The hydrogen gas detector of claim 67, wherein the light/heat source comprises an incandescent lamp having an outer surface, and wherein the rare earth metal thin film is

deposited on said outer surface of the incandescent lamp and is overlaid by a protective film that is permeable to hydrogen gas.